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JANNAF

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Joint Subcommittee Meeting  
5 – 9 December 2016

**Abstract Due Date: Monday, 11 July 2016**

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\* Title: DETERMINATION OF HERITAGE SSME POGO SUPPRESSOR RESISTANCE AND INERTANCE FROM WATERFLOW PULSE TESTING

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### Unclassified Abstract (250 – 300 words; do not include figures or tables)

\* Waterflow tests of a heritage Space Shuttle Main Engine pogo suppressor were performed to experimentally quantify the resistance and inertance provided by the suppressor. Measurements of dynamic pressure and flow rate in response to pulsing flow were made throughout the test loop. A unique system identification methodology combined all sensor measurements with a one-dimensional perturbational flow model of the complete water flow loop to spatially translate physical measurements to the device under test. Multiple techniques were then employed to extract the effective resistance and inertance for the pogo suppressor. Parameters such as steady flow rate, perturbational flow rate magnitude, and pulse frequency were investigated to assess their influence on the behavior of the pogo suppressor dynamic response. These results support validation of the RS-25 pogo suppressor performance for use on the Space Launch System Core Stage.

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